

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

P015245386

FACILITY: MICHIGAN DEPT OF TECHNOLOGY, MANAGEMENT AND BUDGET		SRN / ID: P0152
LOCATION: 7432 PARSONS DR., DIMONDALE		DISTRICT: Lansing
CITY: DIMONDALE		COUNTY: EATON
CONTACT: Heath Miller , Building Trades Supervisor		ACTIVITY DATE: 07/17/2018
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: Announced, scheduled inspection to determine compliance with PTI 296-73 and PTI 156-10B		
RESOLVED COMPLAINTS:		

Inspected by: Michelle Luplow (author) and Janet Michaluk (LDO RRD Brownfield Coordinator)
Personnel Present: Heath Miller, Building Trades Supervisor (millerh11@michigan.gov)

Purpose

Conduct an announced, scheduled compliance inspection by determining compliance with DTMB Energy Center's (DTMB's) Permit to Install (PTI) Nos. 156-10B and 296-73, particularly to ensure that all non-compliance items discovered during the 2017 inspection had been addressed going forward.

Facility Background/Regulatory Overview

This facility was last inspected in April 2017.

Heath Miller, Building Trades Supervisor, said that the DTMB Energy Center provides steam and chilled water (heating and cooling) to multiple DTMB properties throughout the Secondary Complex; all but the Michigan State Police Post is serviced by the Energy Center.

PTI 156-10B was issued to increase the brake horsepower limit in the PTI for EUENGINE1.

During re-permitting of EUENGINE1 the permit engineer, Ambrosia Brown, believed that DTMB may have a Potential to Emit (PTE) over major source thresholds, if DTMB were to take into account the emissions from the boiler permitted under 296-73. I requested that by September 17, 2018 Heath Miller submit a PTE demonstrate for the DTMB Energy Center. I provided him with AP-42 emission factors for the boiler and a link to the PTE workbook to assist him in developing the demonstration.

NSPS for Compression Ignition Internal Combustion Engines, Subpart IIII

The 2206 HP emergency engine is subject to NSPS Subpart IIII. NSPS Subpart IIII requirements were incorporated into the PTI.

Boiler MACT NESHAP JJJJJJ for area sources of HAPs

The 60,000 lb/hr boiler permitted under 296-73 is exempt from the Boiler MACT NESHAP Subpart JJJJJJ because it is classified as a "gas-fired boiler" as defined in 40 CFR 63.11237. To be considered a gas-fired boiler, the boiler must burn gaseous fuels not combined with any solid fuels and burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. The periodic testing of liquid fuel should not exceed a combined total of 48 hours during any calendar year.

NSPS Subpart KKKK for Stationary Combustion Turbines

The 2 turbines are subject to NOx emission limits and performance testing to demonstrate compliance with the limit in Subpart KKKK, and DTMB is required to burn only natural gas in the turbines. The performance test was conducted August 3, 2012.

Inspection

This was an announced, scheduled compliance inspection. At approximately 1:00 p.m. on July 17, 2018, Janet Michaluk and I met with Heath Miller, Building Trades Supervisor. H. Miller was provided with a January 2017

Permit to Install Exemptions Handbook during the previous inspection. Table 1 contains a list of all known equipment at the DTMB Energy Center

Table 1. Equipment located onsite

<u>EU</u>	<u>Description</u>	<u>PTI No.</u>	<u>Installation Date</u>	<u>Federal Regulation</u>
Boiler	60,000 lb/hr boiler (90 MMBtu/hr); natural gas-fired with diesel fuel backup	296-73	1973	Area Source Boiler MACT JJJJJJ does not apply.
EUENGINE1	Compression Ignition, diesel fuel-fired 2206 hp emergency backup generator, manufactured August 2010	156-10B	2/2012	NSPS Subpart IIII
EUTURBINE1	A nominally rated 19.0 MMBtu/hr natural gas-fired turbine with an electrical generator	156-10B	2/2012	NSPS Subpart KKKK
EUTURBINE2	A nominally rated 19.0 MMBtu/hr natural gas-fired turbine with an electrical generator	156-10B	2/2012	NSPS Subpart KKKK
EUHRSG1	A heat recovery steam generator (HRSG) with a nominally rated 20.0 MMBtu/hr natural gas-fired duct burner	156-10B	2/2012	NSPS Subpart KKKK
EUHRSG2	A heat recovery steam generator (HRSG) with a nominally rated 20.0 MMBtu/hr natural gas-fired duct burner	156-10B	2/2012	NSPS Subpart KKKK

PTI No. 156-10B: EUENGINE1, FGTURB/HRSG1, FGTURBHRSG2

EUENGINE1

EUENGINE1 is an emergency backup generator. S. Davis said it is used to power pumps, the permitted (PTI 296-73) 60,000 lb/hr boiler, and chillers in order to maintain steam to the complex.

Emission Limits, Process/Operational Restrictions & Monitoring/Recordkeeping

DTMB is limited to 3.63 tpy NOx per 12-month rolling period on EUENGINE1, as determined at the end of each calendar month and limited to 300 hours of operation per 12-month rolling period. During the previous inspection, DTMB had not been calculating or recording the NOx emissions from this unit and was in non-compliance with the recordkeeping portion of this requirement; a violation notice was sent. DTMB now has records for NOx emissions calculations for all months, starting in May 2017. Attached is the equation that DTMB uses to calculate their NOx emissions, which is based on the 2206 hp of the engine in conjunction with an emission factor of 4.97 g/hp-hr NOx. The 3.63 tpy NOx limit is based on 300 hours of operation, and technically, if DTMB is in compliance with their hours of operation they are also in compliance with their NOx emission limits. For the 12-month rolling period July 2017 – June 2018, DTMB operated EUENGINE1 for 7.07 hours for a total of 0.09 tons per year NOx.

Process/Operational Restrictions & Monitoring/Recordkeeping

The engine is allowed up to 100 operating hours per calendar year for maintenance and readiness testing, where 50 of those hours can be used for non-emergency situations. The records for the hours of operation must be kept, in addition to recording the reason why the engine was operated.

H. Miller provided me with a spreadsheet that includes all times where the engine was operated, the duration of operation, and the reason for operation, in addition to a column for logging all emergency operating hours. H. Miller pointed out that all hours of operation were for maintenance/readiness testing (conducted once per month). DTMB does not have an entire calendar year's records for 2017 because recordkeeping started in May 2017 in response to the violation notice; however, total hours of operation from May 2017 – June 2018 was 8.28 hours for maintenance/readiness testing, and is in compliance with the 100-hour limit.

DTMB is also required to maintain the engine according to manufacturer's emission-related written instructions in order for the engine to maintain its certified status. H. Miller provided me with a copy of their Work Order printout (attached) for their generator maintenance to demonstrate typical activities conducted during monthly maintenance checks; this includes checking antifreeze, oil, and fuel levels and leaks; and cleaning vents, louvers, or screens for any obstructions or debris. H. Miller also said that Michigan CAT conducts inspections and preventative maintenance on the generator (Generator System Preventative Maintenance: Inspection and Preventative Maintenance Checklist") once per year (attached). The most recent inspection/maintenance activities were conducted February 12, 2018, a copy of which was provided to me. During the 2/12/18 event CAT found that there were no repairs needed at that time.

I will be providing H. Miller with a link to CAT's website so that he can request the Operations and Maintenance Manual (OMM) for their engine, a copy of which I ask that he send to me. I will make sure H. Miller understands that they must maintain the engine at the frequencies and at the level that the manufacturer requires, per the OMM plan, to ensure that the engine is maintained in a certified manner.

Design/Equipment Parameters

The EUENGINE1 is required not to exceed a nameplate capacity of 2,206 brake horsepower. According to the nameplate which H. Miller took a photograph of the nameplate which reads 1645 kW at 1800 RPM. Using the conversion factor 1 hp = 0.74569872 kW, the bhp of the unit is 2206 hp.

The unit is also required to have a non-resettable hours meter. I verified that they had one and recorded the total number of hours operated at 59 hours.

FGTURB/HRSG1 and FGTURB/HRSG2 (Cogenerators)

These two flexible groups have the exact same permitted requirements and will therefore be reviewed for compliance together. Each TURB/HRSG unit is a nominally rated 19.0 MMBtu/hr natural gas-fired turbine with an associated heat recovery system (HRS) nominally rated at 20.0 MMBtu/hr using a natural gas-fired duct burner and electrical generator operating in combined-cycle mode.

Scott. Davis, at the 2017 inspection, explained that the cogenerators burn natural gas to power the turbine; the heat from these is sent to the heat recovery system where it is transferred to water in the boiler to produce steam for the secondary complex.

Emission Limits & Monitoring/Recordkeeping

Each TURB/HRSG unit is limited to 5% opacity on a 6-minute average. DTMB is required to perform and document non-certified visible emissions (VE) observations once per month. H. Miller provided me with monthly VE observations records for July 2017 – July 2018. VE observations were conducted once per month and it was documented that no visible emissions were seen (see attached log). There were no visible emissions upon entering and leaving the facility.

Material Limits

DTMB is required to only combust pipeline quality natural gas in the TURB/HRSG units. Natural gas is provided to DTMB by Consumers Energy, who only deliver pipeline-quality natural gas to customers.

Process/Operational Restrictions

DTMB is required to implement and maintain a malfunction abatement plan (MAP) for both cogenerator sets. During the August 3, 2012 inspection, Brad Myott documented that DTMB was out of compliance for not having this MAP within 180 days after initial startup. On October 12, 2012, the MAP was received; the current version is the October 12, 2012 MAP. I have requested that H. Miller provide an updated copy of the MAP by August 17, 2018, which should include at a minimum, the correct reference to PTI 156-10B. At a maximum, I requested that the MAP be updated where necessary to ensure that all preventative maintenance is being conducted on an appropriate time schedule.

I have reviewed the MAP and verified that the MAP contains all information required by the permit.

The permit also requires that DTMB develop a plan that will describe how the emissions will be minimized during startup and shutdown events, based on procedures recommended by the equipment manufacturer. The 2012 violation letter included non-compliance with this condition. In the 2012 violation response letter, Keith Paasch of DTMB explained that startup and shutdown cycles on the two cogenerators are fully automated and cannot be altered. He also said that the system is configured in such a way that if a malfunction occurs the system will not

start.

Design/Equipment Parameters & Monitoring/Recordkeeping

A continuous monitoring system for each cogenerator set is required to monitor and record the fuel consumption and the ratio of water or steam to fuel being fired. Records are required to be kept. H. Miller provided me with continuous records (data point generated every 10 seconds) for May 9 – 13, 2018 (attached) for both units. The records demonstrate that the water:fuel ratio was maintained between 0.47 – 0.60 (HRSG1) and 0.41 – 0.48 (HRSG2). HRSG1 was undergoing maintenance for 2 weeks start May 10, which explains why 0's were recorded from May 10 – May 13, 2018.

Testing/Sampling Requirements

DTMB was required to test for CO and NOx from both cogenerators within 180 days of initial startup. Stack testing was conducted on August 3, 2012 and the test report was received September 21, 2012. CO is limited to 50 ppmv dry at 15% oxygen and 3.7 lb/hr; NOx is limited to 42 ppmv dry at 15% oxygen and 5.0 lb/hr. The following table shows results from the test report in compliance with emission limits:

	CO (ppmv dry @ 15% oxygen)	CO (lb/hr)	NOx (ppmv dry @15% oxygen)	NOx (lb/hr)
TURB/HRSG1	25	0.9	32	1.9
TURB/HRSG2	35	1.4	29	1.9

The operating parameters recorded by Brad Myott during the stack testing are as follows: 0.5 water:fuel ratio, 16 MMBtu/hr heat input capacity, and 17,000 scf/hr.

During the 2017 inspection the following operating parameters were recorded:

EUTURBINE1: 16,000 scf/hr, 0.5 water:fuel ratio, 16 MMBtu/hr
EUTURBINE2: 17,000 scf/hr, 0.4 water:fuel ratio, 17 MMBtu/hr

During this inspection the following operating parameters were recorded:

EUTURBINE1: 17,000 scf/hr, 0.4 water:fuel ratio, 16 MMBtu/hr
EUTURBINE2: 17,000 scf/hr, 0.4 water:fuel ratio, 16 MMBtu/hr

Both turbines appeared to be operating within the same parameters ranges as those established during the stack test. S. Davis explain that the water:fuel ratio is what regulates NOx emissions.

Monitoring/Recordkeeping

Monthly operating hours for each cogenerator set is required to be recorded in a satisfactory manner. I requested monthly records for the 2017 calendar year and 2018 up through June 2018. During the previous inspection, DTMB was in noncompliance with this requirement because operating hours were not documented, only start and stop times of the units. During this inspection, H. Miller provided me with operating hours on both TURB/HRSG units for the 2017 calendar year and 2018 up through June, on a monthly basis (attached). Total hours for 2017 on TURB/HRSG1 and TURB/HRSG2 were 8,579 and 8,529 hours, respectively.

DTMB is required to maintain documentation from the utility specifying that the maximum total sulfur content from the natural gas burned in the cogenerator units is 20 grains of sulfur or less per 100 scf. H. Miller received a statement from Consumers Energy's Tim Voss that the last natural gas test conducted in the area had no sulfur content in it, but that it should not contain more than 0.3 grains of H₂S or more than 20 grains of total S per 100 ft³.

On a calendar-month basis DTMB is required to identify the type and amounts of fuel combusted in both cogenerator sets. H. Miller provided me with monthly records of natural gas usage for the entire calendar year

2017 and 2018 through June (attached). They are reported as monthly totals combined for both cogenerator sets; H. Miller said that there facility has one meter to measure gas consumption and at this time they are not able to meter the natural gas usage for the cogenerator sets on an individual basis. They only use natural gas, units are in mcf/month.

Records of the duration of all times where the two cogenerator units were operated under start-up or shutdown conditions are required to be kept. H. Miller provided me with Solar Turbines Machinery Management Monthly Report for June 2018 (attached) for both cogenerators, which tracks cogen starts, downtime hours, planned downtime events and maintenance, etc. These monthly documents are sufficient for tracking startups and shutdowns.

H. Miller and S. Davis explained that the units are shut down September 22 and restarted on September 24 each year. This period is used for the annual inspection and maintenance on the units. There are occasions where S. Davis explained that too much steam is being produced which trips the system into automatically shutdown. During these times the units are brought back online within an hour. These "trips" are not part of the documented shutdowns and startups.

PTI No. 296-73: Two 60,000 lb/hr steam boilers and one 300 hp steam boiler

Of the permitted equipment under PTI 296-73, only one 60,000 lb/hr steam boiler remains. The other 60,000 lb/hr boiler and the 300 hp steam boiler were removed and replaced with the two HRSG's in 2012. Assuming 80% efficiency and 12,000 Btu/hr, 60,000 lb/hr equates to 90 MMBtu/hr. This boiler is used for backup steam generation.

The unit operates primarily on natural gas with diesel fuel oil #2 as backup, but H. Miller said that this unit has not been used in the past year.

H. Miller mentioned that DTMB plans to replace this unit with a new boiler by October 22, 2019. I informed him that before this replacement occurs, DTMB must either demonstrate that the boiler is exempt from a permit to install, or apply for a permit to install.

The stack height is required to be at least 70' above ground level, and emissions are required to be discharged unobstructed vertically upward. During the inspection it was my professional judgment that the stack height was at least 70' above ground level and was unobstructed vertically upwards.

DTMB is in compliance with the requirements of PTI No. 296-73 at this time.

Compliance Statement: DTMB is currently in compliance with all requirements under PTI's 156-10B and 296-73 at this time.

NAME Michael Davis

DATE 8/2/18

SUPERVISOR [Signature]

